

Software-Based Architecture for Communication and Cooperation Among
Distributed Electronic Agents

ABSTRACT

5 A highly flexible, software-based architecture is disclosed for constructing
distributed systems. The architecture supports cooperative task completion by
flexible, dynamic configurations of autonomous electronic agents. Communication
and cooperation between agents are brokered by one or more facilitators, which are
responsible for matching requests, from users and agents, with descriptions of the
10 capabilities of other agents. It is not generally required that a user or agent know the
identities, locations, or number of other agents involved in satisfying a request, and
relatively minimal effort is involved in incorporating new agents and "wrapping"
legacy applications. Extreme flexibility is achieved through an architecture organized
around the declaration of capabilities by service-providing agents, the construction of
15 arbitrarily complex goals by users and service-requesting agents, and the role of
facilitators in delegating and coordinating the satisfaction of these goals, subject to
advice and constraints that may accompany them. Additional mechanisms and
features include facilities for creating and maintaining shared repositories of data; the
use of triggers to instantiate commitments within and between agents; agent-based
20 provision of multi-modal user interfaces, including natural language; and built-in
support for including the user as a privileged member of the agent community.
Specialized embodiments providing enhanced scalability are also described.